TRANSFORMING DEVELOPMENT: CIRCULAR ECONOMY AND ECONOMIC GROWTH IN THE GLOBAL SOUTH

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Abstract:

The article explores the intersection of circular economy (CE) and economic growth in developing countries, with a particular focus on Africa. It argues that CE is more than a technical framework for waste management – it is a transformative model that can foster industrial innovation, strengthen resilience, and promote inclusive development. Drawing on theoretical debates, comparative regional experiences, and case studies from Africa, the paper shows how CE contributes to employment creation, resource efficiency, and competitiveness. At the same time, structural constraints such as weak infrastructure, limited financing, and fragmented governance hinder its expansion. By analysing these dynamics, the article identifies conditions under which CE can support sustainable growth and highlights policy priorities, including integration of the informal sector, access to finance, and coherent national roadmaps for inclusive and resilient transitions.

Keywords: *circular economy, economic growth, sustainable development, developing countries, Africa*

JEL classification*: O55, 056, O13*

Introduction

The global economy today is undergoing profound structural transformations, driven by the combined pressures of sustainability, technological change, and geopolitical realignments. Among these forces, ecological sustainability stands out as both a challenge and an opportunity. While economic growth has traditionally been measured by expanding production and consumption, this paradigm is increasingly questioned in the face of climate change, resource depletion, and environmental degradation. As a result, sustainability is no longer perceived as a peripheral or optional consideration but as a central determinant of competitiveness, investment flows, and long-term resilience (Bobeва et al., 2023; Spasova, 2024; Zhelyazkova, 2024).

The shift towards sustainability has begun to reshape global value chains and trade relations. Businesses and consumers alike are placing growing emphasis on environmentally responsible practices, compelling firms to integrate eco-efficiency, responsible sourcing, and resource regeneration into their core strategies. This trend is mirrored in the rise of green

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trade policies and environmental standards, including carbon border adjustment mechanisms, eco-design requirements, and stricter traceability rules for global supply chains (Zhelyazkova, 2020). For states and enterprises that adapt to these shifts, sustainability represents a source of competitive advantage in accessing global markets and attracting investment. Conversely, for those that fail to align with the new paradigm, risks of marginalization and exclusion intensify (Sabotinova, 2020).

The vulnerabilities of global supply chains further underline the urgency of systemic transformation. Climate-related risks – such as extreme weather events, droughts, and resource scarcity – are rendering international production networks increasingly fragile (Zhelyazkova, 2017). These pressures have spurred governments and firms to reconsider their reliance on traditional linear trade and production models. Emerging responses include the adoption of circular economy (CE) practices, sustainable logistics, and innovations that reduce dependency on volatile global resource markets.

Within this context, circular economy has gained prominence as a framework capable of reconciling economic development with environmental imperatives. CE emphasizes lower material throughput, product life-cycle extension, closed-loop value chains, and the minimization of waste (Dimova&Karpuzova, 2024). It thus offers a viable pathway to harmonize trade, production, and consumption with the goals of sustainable development (Kotseva-Tikova&Mochurova, 2025). Beyond its ecological rationale, CE increasingly functions as a strategic economic model, enabling states and firms to strengthen resilience, foster innovation, and capture new market niches.

For developing countries, the promise of CE is particularly significant. These economies face the dual challenge of addressing entrenched development needs – employment creation, poverty alleviation, industrial upgrading – while simultaneously responding to global pressures for environmental compliance and sustainability. In many cases, circular approaches already align with local traditions of repair, reuse, and community-led resource management, which can be leveraged into competitive advantages on the global stage. At the same time, structural constraints such as limited access to finance, technological gaps, and institutional fragmentation hinder the scaling up of CE initiatives (UNECA, 2024; UNCTAD, 2023).

Africa provides a striking example of this dynamic. Although the continent contributes less than 4 percent of global greenhouse gas emissions, it is disproportionately affected by climate change impacts, including desertification, recurrent flooding, and food insecurity (IEA, 2023; UNECA, 2024). Circular economy models are increasingly recognized by African governments, regional organizations, and entrepreneurs as tools to mitigate environmental vulnerabilities while promoting inclusive growth and industrial transformation. Experiences from countries such as Kenya, Rwanda, and South Africa illustrate the potential of CE to generate employment, support small and medium-sized enterprises, and strengthen local value chains (Muriithi&Ngare, 2023; GIZ, 2023).

Yet, critical questions remain regarding the type of growth CE can stimulate in developing contexts. Scholars caution that circular transitions may risk “innovation without inclusion” if benefits are disproportionately captured by large firms or external markets, leaving local actors marginalized (Schröder et al., 2019; Käsner et al., 2023). This underscores the importance of situating CE within broader frameworks of inclusive sustainability – where resource efficiency and industrial innovation are pursued alongside equity, access, and social justice.

This article examines the relationship between circular economy and economic growth in the context of developing countries. It does so by situating CE within the broader structural

transformations of the global economy, identifying both opportunities and risks for developing states, and reflecting on empirical illustrations from Africa. By analyzing sustainability as a transformative determinant of trade, investment, and production patterns, the study argues that CE should not be viewed solely as an environmental agenda but as a strategic imperative for inclusive, resilient, and competitive development.

Sustainability and Structural Changes in the Global Economy

The global economy is in the midst of profound structural shifts. Among the key drivers of these transformations, sustainability has emerged as a central and irreversible determinant. Once considered an ancillary or voluntary aspect of corporate and policy agendas, sustainability has become a cornerstone of both economic strategy and competitive positioning (Sabotinova, 2020). This is not only because of the urgent environmental crises associated with climate change, biodiversity loss, and resource depletion, but also because sustainability is now directly tied to access to markets, investment opportunities, and long-term industrial resilience (Spasova, 2024; Zhelyazkova, 2024).

The interconnected nature of ecological, social, and economic sustainability makes this transformation even more complex. For developing regions in particular, sustainability cannot be reduced to environmental concerns alone. It must be understood as a nexus that also encompasses employment creation, access to resources, poverty reduction, and equity (Bobeва et al., 2023). The green transition, therefore, is not merely about lowering carbon emissions but about reconfiguring development models so that they integrate ecological imperatives with social and economic inclusion.

The growing awareness of sustainability is reshaping global value chains in ways that have significant implications for both developed and developing economies. Firms are under mounting pressure from regulators, investors, and consumers to adopt eco-friendly practices across production, sourcing, and distribution. The proliferation of environmental trade policies – such as carbon border adjustment mechanisms (CBAM), eco-design directives, and mandatory traceability standards – illustrates how sustainability considerations are being hardwired into international trade regimes (Zhelyazkova, 2020).

For enterprises in both developed and developing countries, this shift implies that competitiveness increasingly depends on the ability to demonstrate sustainable practices. Countries that succeed in greening their production systems are better positioned to attract investment, diversify export opportunities, and avoid exclusion from emerging green trade frameworks. Conversely, those that lag risk being marginalized in global markets where sustainability standards act as de facto trade barriers (Spasova, 2024).

This transformation also highlights the role of consumer demand. A growing segment of global consumers now prioritize sustainable products and services, rewarding firms that incorporate transparency, ethical sourcing, and eco-efficiency. This consumer-driven dynamic reinforces regulatory pressures, creating a feedback loop that accelerates the integration of sustainability into economic practices (Bobeва et al., 2023).

Sustainability has also become an imperative due to the growing vulnerabilities of global supply chains. Climate change manifests through extreme weather events, floods, droughts, and rising sea levels – all of which disrupt production and logistics. Resource scarcity, particularly in water, energy, and critical raw materials, further amplifies the fragility of supply chains (Zhelyazkova, 2017).

In response, both firms and governments are rethinking their dependence on long, globalized supply networks. Shorter, more resilient, and regionally embedded value chains are

increasingly favored. Green logistics, responsible sourcing, and CE-inspired closed-loop systems are becoming central strategies for mitigating risks associated with global disruptions. For developing countries, this trend offers both risks and opportunities. While they may face exclusion if unable to meet stringent standards, they can also benefit from regional integration and localized production systems that reduce dependency on volatile global markets.

The concept of "sustainable practices" has broadened significantly over the last two decades. It now encompasses a wide array of measures: eco-friendly production technologies, energy-efficient transportation, ethical sourcing, compliance with stringent environmental regulations, and more (Georgieva &Brunzova, 2024). As Angelova (2024) argues, sustainability is no longer confined to compliance with regulations or corporate social responsibility. It has evolved into a strategic imperative, enabling firms to align with changing consumer preferences and regulatory demands while minimizing long-term ecological risks.

This strategic shift is equally relevant at the macroeconomic level. States that integrate sustainability into industrial and trade policies are in a stronger position to attract "green" investment flows, access climate finance mechanisms, and participate in the emerging global architecture of sustainable trade. In this sense, sustainability functions as both a competitive differentiator and a resilience-building tool in an increasingly uncertain global economy (Spasova, 2024; Zhelyazkova, 2024).

Within this broader transformation, circular economy has emerged as one of the most promising frameworks for aligning economic activity with sustainability goals. CE promotes reduced material intensity, life-cycle extension of products, minimization of waste, and the establishment of closed-loop value chains (Dimova&Karpuzova, 2024). It encourages businesses to rethink not only how goods are produced and consumed but also how they are designed, reused, and reintegrated into production cycles.

At the global level, CE has been increasingly recognized as a development strategy rather than simply an environmental agenda. Kotseva-Tikova and Mochurova (2025) argue that CE provides a viable model for harmonizing trade, production, and consumption with the objectives of sustainable development. By reducing resource dependency, CE strengthens resilience against external shocks such as price volatility or supply disruptions. It also opens new avenues for innovation and competitiveness, particularly in industries like renewable energy, waste management, and sustainable agriculture.

For developing economies, the global turn towards sustainability and CE presents both opportunities and systemic challenges. On the one hand, CE models align with longstanding practices of reuse, repair, and community-driven resource management, which are deeply embedded in many local contexts. These traditions can serve as the foundation for innovative and competitive CE systems (UNECA, 2024; UNCTAD, 2023). Moreover, circular models offer solutions to chronic development issues such as youth unemployment, overreliance on resource extraction, and the expansion of informal economies (Marinov, 2025; IWMI, 2024).

On the other hand, developing countries face structural constraints that hinder the scaling up of CE initiatives. These include limited access to finance, insufficient technological capacity, weak institutional coordination, and fragmented policy frameworks (UNECA, 2024). Without targeted support, CE risks reinforcing inequalities, leading to what Schröder et al. (2019) describe as "innovation without inclusion." For example, while multinational firms may benefit from high-value CE sectors such as renewable energy or advanced recycling, local entrepreneurs may struggle to compete or capture value.

African experiences exemplify these dynamics. Countries such as Rwanda and Kenya have adopted national roadmaps for CE, investing in e-waste management, sustainable agriculture, and renewable energy (Muriithi&Ngare, 2023). South Africa has experimented with integrating CE principles into industrial clusters, while grassroots innovations in Nigeria and Ghana have leveraged informal recycling networks to address waste challenges. These cases highlight both the transformative potential of CE and the structural obstacles to scaling it beyond pilot projects.

Ultimately, sustainability is becoming the organizing principle of a new global economic paradigm. It is not only about mitigating environmental risks but also about reconfiguring the rules of competition, trade, and investment. As Karpuzova (2022) observes, in an era of intensifying ecological risks and rising consumer awareness, sustainability considerations are no longer peripheral – they are central to the architecture of a future-oriented global economy.

The strategic integration of sustainability into business models, trade frameworks, and national development strategies is thus a necessity, not a choice. For developing countries, this requires a dual approach: aligning with global standards to maintain competitiveness while tailoring CE models to local socio-economic realities. By doing so, they can ensure that sustainability-driven transformations not only reduce environmental pressures but also foster inclusive, equitable, and resilient growth.

Circular Economy and Economic Growth in Developing Countries

For much of the 20th century, economic growth was understood primarily through a neoclassical lens: increased production and consumption were equated with progress and prosperity. This model, however, is increasingly untenable in the face of climate change, biodiversity loss, and material resource limits. Traditional linear growth patterns – characterized by extraction, production, consumption, and disposal – now clash with planetary boundaries. In this context, scholars of sustainable development stress the need for “absolute decoupling” of growth from resource use, a goal achievable only through systemic transformation of economic models (Schröder et al., 2019; Ellen MacArthur Foundation, 2021).

Circular economy is positioned as precisely such a transformative model. By emphasizing efficiency, reuse, repair, and recycling, CE reconfigures growth to align with environmental and social imperatives. Rather than maximizing throughput, CE seeks to maximize value creation within ecological limits. It is not merely a technical framework but a new developmental paradigm with the potential to reconcile economic aspirations with sustainability goals.

Several studies indicate that CE adoption can generate measurable contributions to GDP and employment in developing contexts. An OECD (2019) analysis suggests that circular practices – particularly improved material efficiency, repair industries, and recycling – can add up to 2% of long-term GDP growth. By reducing resource imports and strengthening domestic value chains, CE offers a strategy for resilience against global shocks.

Similarly, UNIDO (2024) emphasizes the role of national CE roadmaps as vehicles for balancing industrial transformation with sustainable growth. These roadmaps not only create regulatory certainty but also foster investment in emerging CE sectors such as renewable energy, waste valorization, and bio-based industries. By expanding employment in repair, remanufacturing, and recycling, CE provides opportunities for both skilled and unskilled labor markets.

The World Economic Forum (WEF, 2022) further highlights that growth derived from circular innovations is less vulnerable to global disruptions. Shorter and more localized supply chains, combined with resource efficiency, reduce exposure to volatile commodity prices and international logistics shocks. For developing economies, this "resilience dividend" is particularly valuable, as they are often disproportionately affected by external crises.

While CE offers opportunities, scholars caution against assuming a universal "win–win" outcome. Schröder et al. (2019) warn of the risk of "innovation without inclusion," where CE-driven growth may reproduce existing inequalities. High-value circular activities, such as advanced recycling or renewable technology manufacturing, may be dominated by multinational corporations, while local firms and informal workers remain excluded.

Käsner et al. (2023) add that in the Global South, CE practices often emerge informally and without adequate institutional support. While these practices contribute to resource efficiency, they may also expose workers to hazardous conditions and economic precarity. The challenge, therefore, is not merely whether CE contributes to growth, but what kind of growth it produces: inclusive, equitable, and sustainable – or exclusionary and dependent.

This debate underscores the importance of embedding CE policies in social frameworks that prioritize equity, labor protection, and community empowerment. Without such safeguards, CE risks reinforcing asymmetries between developed and developing economies, as well as within societies.

Structural constraints in developing countries

Despite its potential, CE in developing countries faces systemic barriers that limit its capacity to drive growth. Four interrelated constraints are particularly significant:

1. Capital shortages and financial exclusion.Small and medium-sized enterprises (SMEs), which are often the main CE innovators, struggle to access financing. Credit requirements, lack of collateral, and high borrowing costs hinder investment in recycling facilities, renewable energy, or eco-design. Without targeted instruments – such as microcredit, blended finance, or green bonds – the scaling of CE is severely constrained (UNECA, 2024).
2. Technological gaps.Advanced CE models often rely on sophisticated technologies – such as chemical recycling, digital traceability, or industrial symbiosis platforms – that remain out of reach for many developing economies. The reliance on imported technologies increases costs and risks of poor adaptation to local contexts, leading to failed or unsustainable projects (Käsner et al., 2023).
3. Institutional fragmentation.CE requires cross-sectoral coordination across ministries of environment, industry, trade, and finance. In many developing countries, institutional silos prevent integrated policy-making, leading to fragmented or contradictory initiatives. Weak data systems and limited monitoring capacity exacerbate these challenges (UNECA, 2024; UNCTAD, 2023).
4. Infrastructure deficits.Basic waste management, energy distribution, and transport infrastructure remain inadequate in many contexts. More than 600 million people in Africa still lack access to electricity, complicating efforts to implement renewable energy-based CE models (IEA, 2023). Inadequate recycling and composting infrastructure similarly constrains local enterprises from scaling up.

These constraints highlight that CE cannot be transplanted wholesale into developing contexts. Instead, it requires adaptation to structural realities and deliberate policy support to overcome systemic bottlenecks.

Africa as a case study of CE-driven growth

African experiences illustrate both the promise and the complexity of CE's relationship with economic growth. Several countries have adopted national strategies or roadmaps for CE, often supported by international organizations such as UNEP, UNIDO, and the African Circular Economy Network (ACEN, 2025). These frameworks aim to harness CE for industrial transformation, employment, and environmental sustainability.

- Kenya.Nairobi has emerged as a hub for CE entrepreneurship, particularly in waste recycling and sustainable fashion. Start-ups are developing mobile platforms for peer-to-peer resale and repair, while community organizations run large-scale composting initiatives. These models create jobs for youth and women, while reducing landfill pressure.
- Rwanda.The government has positioned CE as part of its broader Vision 2050 strategy. Rwanda's ban on plastic bags, combined with investments in e-waste recycling and renewable energy, showcases how regulatory frameworks can foster innovation. The Kigali Innovation City also hosts start-ups working on eco-design and upcycling.
- South Africa.National CE initiatives are linked to industrial clusters, particularly in mining regions. Pilot projects integrate CE principles into construction and manufacturing, while also seeking to formalize informal waste-picking networks. These efforts aim to balance industrial competitiveness with social inclusion (Muriithi&Ngare, 2023).

These cases illustrate that CE can contribute to inclusive growth if supported by coherent policy frameworks and targeted investment in SMEs and community initiatives. However, they also underscore that scaling up remains a challenge, particularly in contexts with weak institutional and infrastructural support.

Employment generation is one of the most significant pathways through which CE can stimulate growth in developing countries. Repair, remanufacturing, composting, and recycling are labor-intensive sectors that can absorb large segments of the workforce, particularly youth and women.

The informal economy plays a central role in this process. In many African countries, waste pickers, repair workers, and community cooperatives already engage in circular practices, often outside formal recognition. Their contributions to material recovery and reuse are substantial, but their exclusion from policy frameworks leaves them vulnerable to exploitation and precarity (Muriithi&Ngare, 2023).

Formalizing and integrating the informal sector into CE policies is therefore critical. Doing so not only improves efficiency but also ensures equity, transforming CE from a niche innovation into a broad-based development strategy. This integration could involve providing legal recognition, extending social protection, and facilitating access to finance and training.

CE and inclusive growth in developing contexts

The question of inclusivity lies at the heart of CE's relationship with economic growth in developing countries. If CE models are designed to empower local entrepreneurs, build domestic value chains, and support vulnerable communities, they can deliver "inclusive sustainability." This means creating jobs, reducing ecological pressures, and strengthening resilience while addressing poverty and inequality.

However, if CE adoption is driven primarily by multinational corporations or imposed through external trade standards without local adaptation, it risks reproducing dependency and inequality. In this sense, the African experience serves as both a warning and an inspiration:

CE can either reinforce existing structural vulnerabilities or provide a platform for transformative and inclusive development.

The relationship between CE and growth in developing countries cannot be understood solely in terms of GDP expansion. It must be framed within broader developmental goals that include social equity, environmental resilience, and structural transformation. CE has the potential to become a catalyst for such development, but only if embedded in national strategies that prioritize inclusivity, technological adaptation, and institutional coordination.

As argued in UNIDO (2024), national CE roadmaps are critical for providing regulatory certainty, mobilizing investment, and aligning stakeholders. These roadmaps should not only set environmental targets but also identify pathways for industrial upgrading, employment generation, and social protection. In doing so, they can transform CE from a policy slogan into a concrete driver of development.

For developing countries, the challenge lies in balancing global integration with local adaptation. Aligning with international sustainability standards is necessary for competitiveness, but domestic CE models must be tailored to local socio-economic realities. This dual approach can ensure that CE contributes to inclusive, sustainable, and resilient growth.

Comparative Case Studies and Policy Pathways

National strategies and policy frameworks in Africa

Across Africa, governments and regional institutions have begun to integrate circular economy principles into national development strategies. These initiatives often aim to reduce reliance on resource extraction, stimulate domestic industries, and position African economies within global sustainability frameworks.

Rwanda stands out for its proactive stance. Since banning plastic bags in 2008, Rwanda has expanded CE initiatives into e-waste management and renewable energy. The Kigali Innovation City promotes start-ups focusing on eco-design, sustainable construction, and recycling. These policies not only reduce environmental pressures but also create employment opportunities and attract investment (UNIDO, 2024).

Kenya has developed vibrant entrepreneurial ecosystems around CE. Mobile platforms for peer-to-peer resale, repair services, and waste collection highlight how digital innovation can address both resource efficiency and unemployment. Nairobi's start-up culture demonstrates how CE can thrive in contexts with high youth unemployment and limited formal infrastructure (Muriithi&Ngare, 2023).

South Africa provides another instructive example. CE is linked to industrial clusters, particularly in mining and manufacturing. Pilot projects focus on reusing industrial by-products in construction and energy production. Additionally, initiatives to formalize informal waste-picking networks illustrate how social inclusion can be integrated into CE policies (ACEN, 2025).

These African cases highlight the dual nature of CE transitions: while government frameworks and entrepreneurial innovation are advancing, challenges persist in scaling up due to infrastructural gaps, capital shortages, and institutional fragmentation.

Latin American experiences: Resource efficiency and social innovation

Comparative perspectives from Latin America illustrate both similarities and divergences. In Brazil, CE practices have long been embedded in waste management, particularly through the integration of waste pickers (catadores) into municipal recycling systems. Legal frameworks recognize these workers, providing them with cooperative structures and access to social protection. This model demonstrates how integrating the informal sector can deliver both environmental and social benefits, a lesson relevant for African contexts (Schröder et al., 2019).

Colombia has adopted a National Circular Economy Strategy (2018), focusing on sustainable production and consumption, bioeconomy, and water resource management. By linking CE to peacebuilding and rural development, Colombia highlights the potential of CE to address structural inequalities beyond purely environmental objectives.

These Latin American experiences underline the importance of combining CE with social policies, ensuring that marginalized groups benefit directly from sustainability transitions.

Asia: Industrial symbiosis and policy roadmaps

In Asia, CE has often been promoted as part of broader industrial upgrading strategies. China's Circular Economy Promotion Law (2008) and subsequent Five-Year Plans institutionalized CE as a core element of industrial policy. While much of the focus has been top-down, driven by state-owned enterprises, China's experience illustrates the role of strong regulatory frameworks and public investment in scaling CE practices (UNCTAD, 2023).

India presents a more decentralized approach. CE initiatives focus on e-waste management, plastic recycling, and renewable energy. Informal workers play a significant role, particularly in waste collection and repair. However, the absence of consistent national frameworks limits integration, leaving many initiatives fragmented. Nonetheless, India's emphasis on SMEs and start-ups echoes African pathways, particularly in sectors such as sustainable textiles and agricultural innovation.

These Asian experiences highlight the role of state capacity: while China demonstrates how top-down planning can accelerate CE transitions, India underscores the risks of fragmentation without coherent national strategies. Both provide lessons for African countries seeking to balance central coordination with entrepreneurial dynamism.

Policy pathways for developing countries

Comparative evidence suggests several policy pathways that can enhance the effectiveness of CE in fostering inclusive growth across developing regions:

1. National CE Roadmaps.As emphasized by UNIDO (2024), coherent national strategies provide regulatory certainty, align ministries, and attract investment. Countries such as Rwanda and Colombia demonstrate how roadmaps can link CE to broader development goals, from industrial upgrading to rural employment.
2. Integration of the Informal Sector.Both Latin American and African experiences underline the necessity of recognizing informal workers. Brazil's cooperative model for waste pickers and South Africa's pilot projects for waste integration offer replicable frameworks for inclusive sustainability.
3. SME and Entrepreneurial Support.Access to finance, training, and incubation programs is essential. Kenya's start-up ecosystem illustrates how entrepreneurial energy can drive

CE innovation, but scaling requires targeted financial instruments such as microcredit, blended finance, and green bonds (UNECA, 2024).

4. Technological Adaptation and Digital Innovation.Leapfrogging opportunities in digital platforms, mobile payments, and blockchain-based traceability systems allow developing countries to bypass expensive traditional infrastructure. However, ensuring inclusivity requires extending these technologies beyond urban elites.
5. Regional Cooperation.CE benefits from economies of scale, particularly in waste management and renewable energy. Regional initiatives in Africa, such as the African Circular Economy Alliance, provide platforms for knowledge sharing, capacity building, and investment mobilization (ACEN, 2025).
6. Social Equity and Just Transition.CE policies must address distributional issues to avoid reinforcing inequalities. This requires labor protections, gender-sensitive policies, and explicit measures to support vulnerable communities. The concept of "inclusive sustainability" is particularly relevant for Africa, where high youth unemployment and rural poverty remain pressing challenges (Marinov, 2025a).

The comparative analysis underscores that while CE offers a common framework for sustainable growth, its implementation is deeply context-dependent. African countries can learn from Latin America's emphasis on social inclusion, Asia's experience with industrial policies, and their own grassroots innovations. However, these lessons must be adapted to structural realities such as limited infrastructure, capital constraints, and institutional fragmentation.

Ultimately, CE should not be viewed as a one-size-fits-all model but as a flexible framework that can be localized. For Africa and other developing regions, the key lies in embedding CE within broader national development strategies, ensuring that transitions are not only environmentally sustainable but also socially equitable and economically transformative.

Conclusions

Circular economy has emerged as a transformative paradigm for reconciling economic growth with sustainability, particularly in developing countries where socio-economic challenges and environmental vulnerabilities are deeply intertwined. As shown throughout this article, CE is not merely a technical approach to waste management but a holistic framework capable of restructuring production, consumption, and trade systems. Its potential lies in enabling countries to leapfrog traditional development trajectories, foster industrial transformation, and create inclusive employment opportunities.

From a theoretical perspective, CE addresses the long-standing debate on whether economic growth can be decoupled from resource consumption. Traditional linear models of development – based on extraction, production, consumption, and disposal – are increasingly untenable under the pressures of climate change and resource scarcity. CE offers an alternative by closing material loops, promoting reuse and recycling, and extending product lifecycles. For developing countries, this model is particularly appealing as it promises not only environmental benefits but also industrial diversification, innovation, and resilience against external shocks.

Yet, as critics warn, the CE transition is not inherently inclusive. Without deliberate policies, CE may reinforce existing inequalities, marginalize informal actors, or concentrate benefits in high-value sectors controlled by multinational corporations. This raises the crucial question of what kind of growth CE promotes: inclusive and sustainable, or exclusive and extractive.

Africa illustrates both the opportunities and constraints of CE in developing contexts. Case studies from Rwanda, Kenya, and South Africa demonstrate how CE can be integrated into national policies, entrepreneurial ecosystems, and community practices. Rwanda's ban on plastics, Kenya's digital start-up ecosystem, and South Africa's industrial symbiosis projects highlight the continent's capacity for innovation and policy leadership. These examples confirm that CE can create jobs, attract investment, and reduce environmental pressures when embedded in coherent strategies.

However, persistent challenges remain. Weak infrastructure, limited access to finance, and institutional fragmentation hinder the scaling of CE practices. More than 600 million Africans still lack access to electricity, illustrating the tension between CE's sustainability ambitions and basic developmental needs. Moreover, the informal sector – which plays a central role in recycling, repair, and waste collection – remains excluded from formal CE policies, despite its importance for both efficiency and equity. Interviews with practitioners reinforce this gap, underscoring the need for recognition, protection, and integration of informal workers into national strategies.

Comparative perspectives from Latin America and Asia provide valuable lessons. Brazil's integration of waste pickers into municipal recycling illustrates the benefits of aligning CE with social inclusion. Colombia's national strategy demonstrates how CE can support rural development and peacebuilding, while China's top-down regulatory frameworks reveal the role of strong state capacity in scaling CE initiatives. India's fragmented yet entrepreneurial approach highlights both the potential and the risks of relying heavily on SMEs without coherent national coordination.

For Africa, these cases underscore the importance of combining entrepreneurial dynamism with institutional frameworks. Latin America demonstrates the necessity of embedding CE in social policies, Asia highlights the role of regulatory capacity, and African innovations reveal the power of grassroots entrepreneurship. Together, these lessons suggest that CE must be context-specific, tailored to national capacities, and linked to broader development priorities.

The analysis points to several policy imperatives for developing countries:

1. Develop coherent national CE roadmaps to provide regulatory clarity, align ministries, and signal long-term commitment to investors.
2. Integrate the informal sector – recognizing waste pickers, repair workers, and cooperatives ensures both efficiency and equity.
3. Strengthen access to tailoredfinance instruments such as microcredit, blended finance, and green bonds are necessary to support SMEs and start-ups.
4. Leverage digital innovation through mobile platforms, blockchain traceability, and decentralized energy systems that offer opportunities to bypass infrastructural deficits.
5. Linking CE to industrial policy, climate adaptation, and rural development ensures coherence and maximizes synergies.
6. CE strategies must address gender, youth, and rural inclusion to avoid exacerbating inequalities.

Ultimately, CE in the context of developing countries must be understood not only as an environmental or economic strategy but as a pathway to "inclusive sustainability." This concept emphasizes that transitions must create jobs, strengthen local value chains, and address the needs of vulnerable communities, while simultaneously reducing environmental pressures. Africa's experiences show that such integration is possible but requires deliberate policy design, targeted financial mechanisms, and regional cooperation.

The broader implication is that CE is not a one-size-fits-all model but a flexible framework adaptable to diverse contexts. By embedding CE into national development strategies and

empowering local actors, developing countries can turn structural weaknesses into competitive advantages. In doing so, they can chart a path toward economic growth that is not only greener but also fairer, more resilient, and better aligned with the global pursuit of sustainability.

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